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## TEACHERS' ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN SENIOR HIGH SCHOOL ECONOMICS INSTRUCTION

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### Abstract

This research has been meant to (1) describe the adoption of ICT in economics instruction, (2) discover the influence of the characteristics of innovation variables to the adoption of ICT, (3) discover the influence of the environment variables to the adoption of ICT in economics instruction, (4) discover the influence of the affective variable to the adoption of ICT in economics instruction, and (5) discover the influence of the demographic variables to the adoption of ICT in economics instruction. This research employed the combination of the quantitative and qualitative approaches known as the mixed method. The qualitative data were results of interviews with economics teachers, economics instruction supervisors, students, school principals, and on-service-teacher trainers. The qualitative data were analyzed qualitatively through the steps of data reduction, data presentation, and conclusion drawing. The research results showed the following conclusions. First, most teachers often employed information and communication technology in economics instruction. Second, the ICT adoption models which contain the innovation characteristics variable, the environment variable, the affect-towards-use variable, and the demographic variable worked well in explaining the diversity of the adoption in economics instruction. Third, the variables in the group of characteristics of innovation variable which had significant influence to the adoption of ICT were voluntariness, relative advantage, result demonstrability, and ease of use. Meanwhile, those which did not have significant influence were those of compatibility, image, trialability, and visibility. Fourth, all variables in the group of environment variable which consisted of social influence facilitating conditions had significant influence to the adoption of ICT in economics instruction. Fifth, the variable of affect toward use consisted of the feeling of liking and the feeling of interest had significant influence to the adoption of ICT in economics instruction. Sixth, the group of demographic variable was not good predictors in relation to the adoption of ICT in economics instruction. None of the five sub-variables in the demographic variable, which consisted of school status, age, gender, experience and duration in training participation, had any significant influence in the adoption of ICT in economics instruction.

**Keywords:** *adoption, information and communication technology (ICT), teachers, economics instruction innovation*

### I. INTRODUCTION

Economics learning needs to be delivered contextually to accommodate the context of the lives of young people including the development of technology that characterizes their lives. They are a generation that grew up with digital technology, quick access to information from various sources, more like interacting via the virtual

world. Don Tapscott (2009) termed The Net Generation for these people or who were born in 1977-1997.

Various forms of diffusion of education policy will not have much meaning if it is not matched by an adequate level of acceptance. In this context, the problem is not a lot of economic teachers utilize a variety of media-based ICT in learning. Need to be investigated factors that influence the adoption of ICT in learning economics in high school. By knowing these factors can formulate effective policies.

Some experts expressed various theories adoption or diffusion of innovation, but Surry & Ely (2002) reveals that the diffusion of innovation theory of Rogers (1995) is a theory that most referenced. This is in line with the experience of research on educational technology carried out by Ricradson (2009) reveals that Innovation Diffusion Theory (IDT) is effective in revealing the adoption of ICT. Important determinant of technology adoption according to this theory is that the variables called perceived attributes of innovation or also referred to the innovation characteristics (Agarwal and Prasad 1997; Moore & Benbasat, 1991; Rogers, 2003; Askarany 2009). Attribute or characteristic that is a relative advantage, compatibility, trialability, result demonstrability, ease of use, and visibility.

Towards Affect Use are feelings of joy, cheerful, happy, or depressed, unhappy, or hate which are linked by a person with a certain activity (Thompson, et al, 1991; Jogyanto, 2007). Thompson et al. (1991) reveals the hypothesis that there is a positive relationship between the perceived use of a computer and the intention of using the personal computer. In connection with the adoption of ICT in the learning economy, positive feelings will encourage the use of ICT in the learning economy.

The purpose of this study was to describe the extent to which there has been a learning adoption of ICT in the economy and to determine the influence of variables characteristic of innovation, environment variables, variables feelings towards the use and demographic variables to the adoption of ICT in the learning economy.

## **II. METHOD**

Quantitative data collection instrument was a questionnaire. It is given through the process of translation by an expert, the process of adaptation, and testing processes. The trials conducted on 33 people instrument economics teacher in Sleman and declared valid and reliable after some refinement. The qualitative data consists of transcripts of interviews of five economic teachers, one of which doubles as the school principal, five supervisors of economic subjects from the department of education, five students, four vice-principal areas of curriculum, one *widyaiswara* economy of Insurance Agency quality of Education (LPMP) and one person lecturers from the Institute for Communication Technology Education (BTKP). The data were analyzed using multiple regression statistical assessment method ordinary least square (OLS) and processed by the application program IBM SPSS version 19 statistical methods of data entry with enter method, which means the data is processed simultaneously at a time. Models of regression can be seen in Equation 2. To predictions generated can be closer to the actual conditions, the model estimation performed classical assumption. Classic assumption test conducted are three kinds, namely test: 1) multi-co-linearity, 2) *heteroskedasticity*, and 3) normality.

The data obtained by researchers of the field is then reduced, summarized, and then sorted out the subject matters, have focused on the most important and then look for a theme or pattern (through editing, coding and Tabling). Data sorted out and set aside to be sorted according to the group and is prepared similar category to be displayed in order to align with the problems faced, including the tentative conclusion that obtained at the time the data is reduced.

### **III. RESULTS AND DISCUSSION**

The coefficient of determination ( $R^2$ ) of 0.663, meaning that variations in the adoption of information and communication technology for learning economy can be explained by variations in the variables explanatory consisting of volunteerism, relative advantage, compliance, image, visibility of results, visibility, the possibility of testing, perceived ease, social influence, facilitating conditions, sensation to use, school status, age, gender, experience, and training of 66.3%, while the remaining 33.7% is explained

by other factors. F test results showed that the value of  $p = 0.000$  means that the model can be used to predict the adoption of ICT in the learning economy.

From interviews with respondents, ICT are widely used in high school to study economics is a computer with an application program Power Point and Microsoft Word. The use of Power Point, is widely used by almost all teachers. As one teacher "... the more often I use is Microsoft Power Point and Microsoft Word ...". In addition, there are other programs that are also used by teachers but with the frequency of the use of fewer, namely (a) the application program for browsing, weblog, and email, (b) a spreadsheet application program, especially Microsoft Excel, (c) application program Adobe Reader, and (d) multimedia application program.

Hypothesis testing shows that voluntarism negatively affect the adoption of ICT. This means the use of ICT will be a lot to do if it is not voluntary. Respondents express suggestion or require the use of ICT will encourage the use of ICT in the learning economy, as expressed by a respondent "... required to actually encourage the use of ICT. Due to require on the one hand requires teachers to use on the other hand requires school leaders to supplement the means ". Other respondents who said that to require or recommend that would give the impression that the use of ICT is a profession demands "... ICTs has been the demands of the profession; teachers should be able to force myself to use ICT".

The hypothesis testing showed that the relative superiority gave positive effect on the adoption of ICT in the learning economy. Respondents revealed Learning is more effective because the material easy to understand more clearly expressed the students as a respondent "... is more effective because the material is more clearly shown ...". In addition, respondents also revealed the advantages of relative such as a more attractive, more efficient, and more focused as expressed by the respondents as follows: "... the advantages of ICT that is attractive, learning so timely because it narrows the opportunity to turn direction, children calmer because the focus ... ". ICT teachers felt could do with more contextual learning such respondents expressed as follows: "... the ICT can be taught on contextual due to ICT we can look at a real world

example, the share price can we find on the internet. With the internet we will get actual data, real ... ".

The hypothesis testing showed that the visibility of the variable results of a positive influence on the adoption of ICT in the learning economy. The opportunity to communicate the results of using ICT occurs in various occasions. Respondents revealed that forums such teachers Deliberation Subject Teacher (MGMP) or Deliberation Learning Development (MPP) is a good forum for mutual communicating the results of using ICT as expressed by the respondents as follows: "... the communication regarding the benefits of the use of ICT occurs especially when MGMP ... ". The interesting thing from among teachers is their willingness to share as expressed by the respondents as follows: "... among the teachers there is no atmosphere to conceal the learning device or media, they even each copy, share, mutual anyway, complementary, especially when there are new pictures or no interesting material ... ".

Hypothesis testing results show that the ease of use of a variable positive effect on the adoption of ICT in the learning economy. According to the teachers, their ICT classed difficult and their ICT classed easy as disclosed respondents following "... ICTs easy so far only Power Point, Word, and Excel ..." while those considered difficult to express as follows: "... programs as difficult as making Video Streaming, Streaming Radio, Micro Media Flash and blog ... ". Ease of use fosters confidence to use as expressed by the respondents as follows: "... find it easier and will eventually encourage the use of ICT ...". The phrase that respondents interesting is that ease of use will create a need to explore teachers use ICT as expressed by the respondents as follows: "... the taste is encouraged to explore and challenge to use TIK more further".

Hypothesis testing result showed that social influence variables affect the adoption of ICT in the learning economy. Respondents revealed that the effect of using ICT comes from various parties that include students, colleagues, principals, department of education, and family. The parties encourage teachers to use ICT as expressed by the respondents as follows: "... a good social influence of peers, of leadership, of the students, as well as from the other it encourages the use of ICT in learning ...".

Hypothesis testing results show that the variable conditions that facilitate positive influence on the adoption of ICT in the learning economy. Availability of facilities in schools is now seen as support teachers in making learning even though the facilities provided is deemed still minimal as expressed by the respondents as follows: "Although ICT facilities are still limited, but its presence encourages the use of ICTs". Facility as an environment will shape one's personality through the process of habituation as expressed by the respondents as follows: "... I think the availability of facilities to encourage teachers to use ICT, the facility seems to me as the physical environment. The physical environment that I think will shape one's personality ... if schools provided a wide range of ICT facilities, the teachers will adjust to get used to using ICT in learning ...".

Hypothesis testing results show that the variable feelings towards the use of positive influence on the adoption of ICT in the learning economy. Feeling happy and satisfied encouraged teachers to use ICT in teaching as expressed by the respondents as follows: "... I feel happy to encourage the use of ICT in the learning economy ...". Pleasure use ICT also foster a sense of mutual help when facing difficulties as expressed by the respondents as follows: "... the feeling we love using ICT ... if there is a problem we usually help each other ...". Feeling happy also foster a desire to explore to discover the benefits of ICT as expressed by the respondents as follows: "... the pleasure that fosters a desire to explore discover the benefits ...".

Voluntariness of ICT gives significantly negative effect on the adoption of ICT in the learning economy. The use of ICT in teaching economics at school tended to be "highly recommended" approaching a liability. This situation on the one hand to encourage teachers to use ICT on the other hand demanded that the head of the school to provide adequate facilities. This atmosphere also gives the impression that the teachers use ICT is the demands of time, ICT is the main media, use of ICT is a profession demands. The things that caused volunteerism are negatively related to the adoption of ICT in economic learning. This study is also consistent with research Agarwal and Prasad (1997: 571) that volunteerism is also a significant effect on the use

of ICT among professionals who are following the MBA program. Directions effect of volunteering on the use of ICT is also negative or opposite each other.

Relative advantage of ICT significantly positive effect on the adoption of ICT in learning relative economy. The benefit that affect the adoption of ICT in economic learning because teachers can experience the advantages of ICT, namely: (1) creating effective learning, (2) create efficiencies time performance learning, (3) more interesting students in learning, (4) learning more contextual, (5) students more independent learning, (6) teaching material more easily editable, and (7) the teaching materials are physically more manageable.

Result demonstrability of ICT significantly positive effect on the adoption of ICT in the learning economy. The results of the use of ICT in the learning economy can be identified and communicated individually at school or in the forums regularly held such MGMPs, MPP, and other meetings. This makes the visibility of results of significantly influencing the adoption of ICT in the learning economy.

Ease of using of ICT significantly positive effect on the adoption of ICT in learning economy. This easiness affected the use of ICT in the learning economy because: (1) ease of use motivation, (2) ease of use foster self-confidence, (3) ease of use fosters the desire to explore, and (4) ease of use make the teacher feel lucky because with relatively little effort can get the desired result. The results showed that the complexity significantly affect the use of groupware applications program with the direction of the negative impact in the context of lectures at universities.

Social influence gave significantly positive effect on the adoption of ICT in the learning economy. Important people or people who are considered influential on teachers encourage the use of ICT through their respective roles. People of influence are students, colleagues, principals, department of education, and family. Research conducted by Venkatesh et al (2003) distinguishes the context of research into two, namely background voluntary use of information technology (voluntary settings) and mandated the use of technology (mandatory settings) in that study concluded that social influences affect the use of technology when the information when mandated but not significant when it is at the background of the use of information technology

voluntarily. In the context of the adoption of ICT in learning research this economy, the use of ICT in the classroom tend to be mandated for use of ICT has been included in the legislation and into programs in the implementation of teaching in schools from the center to the school. So this study is consistent with research conducted Venkatesh et al (2003).

Facilitating conditions is significantly positive effect on the adoption of ICT in the learning economy. Conditions that facilitate the use of ICT in the learning economy is quite diverse from one school to another school. Existing facilities will form a personality through a process of habituation. On the other hand, the availability of the facility will encourage school leaders to create policies that encourage the use of existing facilities. This makes the conditions that facilitate significantly affect the adoption of ICT in the learning economy. Research conducted by Venkatesh et al (2003) to produce research findings are somewhat different. In this study, the variable conditions that facilitate significant effect on the use of information technology are only if moderated by age and experience. Results of research conducted by Thompson et al. (1991) found different things. In that study concluded that the conditions that facilitate not affect the use of personal computers. Differences in the findings of this study may be due to differences in the characteristics of different respondents. Research conducted by Thompson et al. used educated-employees as respondents in multinational companies. On a scale of multinationals, educated employees are likely to face a more standardized facilities are of course different than the economics teachers who are in schools that have high variability in terms of ICT facilities owned.

Affect toward use significantly positive effect on the adoption of ICT in the learning economy. Variable feelings toward the use of which consists of a sense of fun and flavor attracted a significant influence on the adoption of ICT in the learning economy. Pleasure to use ICT will encourage repetitive actions and to try harder to keep using ICT. Pleasure also cultivates a sense of mutual help and the desire to explore the use of ICT for learning. Research conducted by Thompson et al. (1991) found different things. In that study concluded that the feeling against the use does not affect the use of personal computers. Differences in the findings of this study may be due to



differences in the characteristics of different respondents. Until now, the economics teacher could still do without the use of ICT learning, but in the context of the industry such as in the setting Thompson et al (1991) the situation could be very different. In the industrial world in the event of system changes those changes are likely to occur massively and are likely unavoidable due to the interdependence between the parts, so happy not happy employees still need to wear them.

#### **IV. CONCLUSION**

This research resulted in several conclusions as follows:

1. Most teachers often use ICT in the economic learning. The application program that is widely used is Microsoft Office application programs especially Power Point and Microsoft Word. In addition, there is a program that is used but the frequency is low.
2. Model adoption of information technology and communications which contain groups of variables characteristic of innovation, the environment variable group, variable feelings towards the use, and demographic variables group works well in explaining the performance of the adoption of information and communication technologies in the learning economy.
3. Variables in variable group characteristic innovations that significantly influence the adoption of information technology is variable volunteerism, relative advantage, the visibility of results, and ease of use. While the variables are not significant is the compatibility, image, visibility, and the possibility of testing.
4. All variables in the environment variable group consisting of social influence and facilitating conditions that significantly affect the adoption of information technology in the learning economy.
5. Variables feeling of use is a good predictor of the adoption of ICT in the learning economy.
6. The group demographic variables is not a good predictor associated with the adoption of information technology in the learning economy. Five variables, school status, age, gender, experience, and duration of training none of which significantly influence the adoption of ICT in the learning economy.

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